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WATER SUPPLY FOR VILLAGES.

Mr. Leyland Woods, of Chilgrove, has kindly forwarded the following details of the plan he has adopted for his villagers, scattered over some 2,000 acres of the Sussex chalk hills, a plan which has the high merit of having been long (40 years) tried, extensively adopted, and not having failed even with the drought of 1864—in fact, much was in store when fresh rains came to replenish the cisterns :—

In those districts of England where surface-springs and constant streams do not abound, or where water has to be obtained from wells of great depth, a supply of good water in reasonable abundance is often very deficient in the cottages of the labourer. To overcome this great need, each cottage or pair of cottages should be supplied with an underground tank, in which the surplus water falling on the roof during periods of abundant rainfall can be preserved for future use. The advantages of these tanks have been so beneficially felt in this village during the dry seasons of the past few years, that I venture to give the result of my experience for the benefit of those who cannot help themselves without the provident care of the owner of the cottage or farm.

Cottages should be tiled or slated, and iron or copper guttering fixed under the eaves which will convey the rainfall, first into a galvanized iron cistern, containing from 50 to 100 gallons—this will supply the daily wants of a family in wet seasons without recourse to the pump. The overflow of these cisterns must be conveyed into the tank which is underground and covered over with an arch of brick. No air or light should be admitted into these reservoirs. The water is preserved in greater sweetness and coolness than when exposed to the atmosphere. The method of building these tanks is, first to dig a hole of the required size, then build walls of stone, brick, or flint, about twelve inches thick, fill them well in with grouting or concrete against the earth, and make a concrete bottom of broken flint or brick ; cover in with an arch of brick, one or two courses in thickness, according to the strength required ; leave a man hole at the top and two holes at the ends, one to admit the water, the other for the overflow and for the admission of the lead pipe of the pump. After the walls have become tolerably dry, perhaps in a fortnight, coat the walls and bottom with a covering of good Roman cement, or with two or three courses of tiles laid in good grey lime mortar. All the work requires to be carefully and substantially done. In less than a month the tank will be ready for use, The water where admitted should not run down the walls, but empty itself through a piece of iron or earthen pipe, clear of the wall. The size of these tanks varies from 30 to 300 hogsheads, but one of 50 hogsheads will be sufficient for a pair of cottages. If the average rainfall of a district be about 30 inches, the quantity of water which would fall on the roof of a pair of good sized cottages may be estimated at about 200 hogsheads. This water will be sweet, cool, and wholesome, will require no filtering process, and is better than spring water for all household purposes, for brewing, for tea, and cooking, and especially for washing, as without soda, it will save more than half the soap.

A tank of 50 hogsheads will require to be twelve feet long, six feet wide, and six feet deep, inside measure. The hole will require to be dug out fourteen feet

long, eight feet wide, and ten or eleven feet deep, thus allowing the arch to be entirely underground. To build such a tank, there will be required 18 tons of flints, 15 tons of sand and coal ashes, 10 quarters of lime, 5 casks of cement, and about 600 bricks for the arch, if only one brick in thickness. The cost of digging out will be about 30s., or 40 yards at ninepence, and the bricklayer's work about £5, without reckoning the cost of the carriage of materials. The tank can thus be built for about £14; a galvanized cistern 36 × 30 × 24 inches would cost £2 10s., and the guttering and pump about £6. For the sum of about £22, two families can be supplied with excellent water. When wells vary in depth from 100 to 300 feet, the labour of drawing water is very great, and falls chiefly on the man on his return home from a hard day's work. With a tank the wife or child can pump as the water is required. A cottager would cheerfully pay an additional rent of ten shillings for such a supply of good water.

W. LEYLAND WOODS.

FLOOD AT PORT LOUIS, MAURITIUS.

Lat. 20° 9′ S. ; Lon. 57° 31′ E.

February 12th, 1865.

THE destruction of life and property occasioned by this flood having been very great, and the investigation into its cause very complete, I have had much pleasure in extracting a brief narrative from the official report (for the loan of a copy of which I am indebted to my friend, Rev. G. H. Billington).

It appears that the town of Port Louis is not very much above high water level, and that some small streams, having their origin in the hilly country at the rear of the town, pass through it in open channels, which also act as drains. No violent floods having been experienced for many years, these watercourses seem to have been gradually encroached upon and contracted; added to this, one of them had been diverted, and some arrangement made for discharging the water by means of a self-acting syphon. It, however, acted the wrong way, and brought sea-water into the town. I gather from the report that the reasons for diverting this stream was, that a new railway station had been erected where the stream used to discharge into the harbour.

It is unnecessary to enter at any length on the description of the catastrophe; it is sufficient to picture to oneself 5 feet deep of water running through the streets in the dark, and at a rate variously estimated at from 1 to 20 miles per hour; people clinging to the trees till they were swept away, a grindstone 4 feet in diameter carried several yards, an iron boiler several miles, two cases, each containing a portable forge, washed away, one being carried right into the harbour.

A Commission having been appointed, several suggestions as to alterations and improvements in the channels were made, but they, of course, have nothing to do with the rainfall. It was clearly shown that the flood arose, not from rainfall *at* Port Louis, but on the hills at its rear. It does not appear to have arisen from the bursting of a waterspout, because then the heavy fall would have been of limited area, but it does seem that the Commissioners were fully justified in offering the following explanation:—

The Committee, then, taking into consideration that the extreme heat (mean temp. 82°·9) which had prevailed throughout the latter part of January and the early part of February, had rarefied the air to an extraordinary extent, that the usual trade winds had been considerably diminished in force, that no bad weather had been experienced for some time previous to the flood, that the utmost velocity of the wind never approached within 35 miles of its ordinary rate in a hurricane, that the barometer only fell ·206 inches between noon of the 4th and noon of the 11th, and ·312 inches between noon of the 11th, and 4 p.m. of the 12th February, and that the total rain which fell from 9½ a.m. on the 12th, to 9½ a.m. on the 13th was only 7·46 inches, do not consider that the flood of the 12th February was in any way due to the presence in the neighbourhood of this island of an ordinary cyclone; but they believe that a mass of aqueous vapour, drawn from the equator towards the island in consequence of the rarefaction of the atmosphere,

which extended to a considerable distance, meeting with the mountains in the northern and north-western portions of the island, was thrown up by those barriers in accumulated masses into a colder region than that in which they were first floating, and that the moment of complete saturation of the atmosphere having arrived, rapid condensation took place, and the aqueous vapour poured down in the tremendous flood of the 12th of February last.

Rainfall in different parts of the island from 9½ a.m. on 12th, to 9½ a.m. on 13th February, 1865.

	Inches.		Inches.		Inches.
Mont Choisy	6·57	*Port Louis.....	7·46	The Braes	12·25
Les Roches.....	9·21	Gros Caillon	10·05	Cluny	9·86
Labourdonnais	10·47	Croft-on-Righ	14·65	Gros Bois	4·03
Lucia	13·11	Espérance	10·24	Beau Vallon.....	4·87
La Gaieté	18·30	Trianon	11·62	St. Aubin	5·22

Greatest Fall in 24 hours, at Port Louis, in each year, from 1853 to 1865.

1853.	April 9 ...	2·87	1858.	Jan. 16 ...	5·04	1862.	May 25 ...	3·24
1854.	,, 19 ...	4·02	1859.	Dec. 5 ...	4·30	1863.	Jan. 13 ...	3·17
1855.	Feb. 4 ...	5·38	1860.	†Jan. 27 ...	11·65	1864.	Feb. 11 ...	2.45
1856.	April 24 ...	2·72	1861.	Feb. 16 ...	10·00	1865.	Feb. 12 ...	7·46
1857.	Jan. 28 ...	9·55						

C. MELDRUM,
Superintendent of Observatory.

REMARKABLE AURORA BOREALIS, OCTOBER 19TH, 1865.

To the Editor of the Meteorological Magazine.

SIR,—On Thursday, the 19th October, 1865, at a quarter to seven, p.m., an auroral arch, of a yellow colour, originated in the N.E. and proceeded quickly to the S.W. (Reid and Dove's poles of the wind), becoming thin and filamentary till it nearly touched the distant hills in the S.W., thus spanning the sky, and dividing it into two equal parts, as if marking out the boundary of the coming aurora. The wind was from the N.E., and seemed to bend part of the arch, sometimes to the S. and sometimes to the N. In about half-an-hour the arch slightly moving to the S. disappeared beyond the belt of Orion; when in the N.W., and in the direction of the magnetic pole, small streamers were observed, pointing to the zenith; they gradually extended to the west and east, completely filling one-half of the sky as marked by the arch, and giving a light nearly equal to the full moon. The coruscations, or streamers, were brilliant; at one time waving to the right, and at another time to the left hand. A more beautiful display of aurora borealis than this I have never seen, not even in Zetland. The aurora disappeared about 10 p.m., but the horizon to the N. continued to be illumined most of the night. Falling stars were observed at the time, followed by rain and a hailstorm.

Piazzi Smyth remarks, that "during an aurora, there is no lightning;" now, it is probable, that as lightning restores to an equilibrium the electricity or magnetism of the lower regions of the atmosphere, the aurora may do the same to the higher regions.

This aurora was observed at Selborne, Wisbech, Orleton, York, North Shields, and Haverfordwest in England; at Aberdeen, Otter House, Scourie, and Sandwick, in Scotland; at Monkstown, Galway, and Doo Castle, in Ireland.—*Symons's Rain Circular, October.*

WILLIAM RANKIN, M.D. and M.B.M.S., &c.

Otter House, 31st January, 1866.

*At Port Louis Observatory the gauge is 40 feet above ground, and 70 feet above mean sea level; the fall up to the same hour on the 11th was 2·23 inches, and on the 12th, 2·75 in.

†It is doubtful if 11·65 fell in January, 1860. The soldiers who took the observations that year did not, in my opinion, record the fall correctly. 90·34 was stated to be the fall that year, which is more than double any year before or since. Rainfall on that day is stated by the Meteorological Society of the Mauritius as 5·82 in.

RAINFALL IN FEBRUARY, 1866.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	Height of Gauge. Above Ground	Above Sea Level.	Depth of Rain. Total Fall.	Difference from average 1860–5	Greatest Fall in 24 hours. Depth.	Date.	Days on which ·01 or more fell.
		ft. in.	feet.	inches.	inches.	inches.		
I.	Camden Town	0 6	100	3·72	+2·50	·49	9	18
II.	Staplehurst (Linton Park)	0 6	200 ?	4·55	+3·04	·62	11	20
,,	Selborne (The Wakes)	4 0	500 ?	5·47	+3·76	·94	11	19
III.	Hitchen	2 0	240	3·28	+2·02	·70	12	20
,,	Banbury	7 0	345	2·30	+ ·87	·35	11	24
,,	Wisbech	0 6	10	2·52	...	·49	27	17
IV.	Bury St. Edmunds (Culford)	1 2	...	3·59	+2·17	·68	26	15
V.	Calne	0 11	250	3·98	...	·60	1	21
,,	Plymouth (Goodamoor)	0 2	580	6·52	+3·16	1·24	14	23
,,	Barnstaple	0 6	31	4·56	+2·48	·75	1	21
,,	Taunton (Fulland's School)	1 4	...	4·05	...	·70	1	20
VI.	Shrewsbury (Highfield)	5 6	200	2·18	+1·04	·37	7	14
,,	Tenbury (Orleton)	0 9	200	3·02	+1·45	·52	12	23
VII.	Leicester (Wigston)	0 6	220	2·78	+1·44	·48	12	19
,,	West Retford	0 6	50	2·25	+1·11	·49	11	20
,,	Derby	5 0	180	2·25	+ ·77	·31	11	20
VIII.	Manchester	2 7	106	2·98	+1·03	·44	6	20
IX.	York	0 6	50	2·50	+1·12	·68	11	22
,,	Skipton (Arncliffe)	3 0	750	9·15	+5·47	1·32	5	16
X.	North Shields	1 0	124	1·78	+ ·25	·31	11	20
,,	Borrowdale (Seathwaite)	1 0	422	19·17	+7·79	2·30	22 & 25	24
XI.	Abercarn	1 3	450	7·07	...	2·00	10	17
,,	Haverfordwest	2 0	60	5·41	+2·55	·80	10	20
,,	Rhayader (Cefnfaes)	2 0	880	6·03	+3·05	·78	6	21
,,	Llanberis (R. Victoria Hotel)	1 0	370	...	...	...	...	...
XII.	Dumfries	0 5	70	3·00	+ ·45	·42	6	17
,,	Hawick	4 0	580	4·02	...	·48	6	22
XIV.	Ayr (Auchendrane House)	2 3	94	5·30	+1·94	·78	6	21
XV.	Otter House	0 6	130	7·41	+3·49	1·07	6	22
,,	Fort William	0 8	20	9·03	...	1·55	5	25
XVI.	Leven (Nookton)	0 6	80	4·10	+2·40	1·02	14	19
,,	Stirling (Deanston)	0 0	130	5·91	+2·91	1·11	5	21
,,	Logierait	1 0	250	3·73	...	·77	5	18
XVII.	Ballater	0 10	656	3·25	...	·50	14	21
,,	Aberdeen	4 8	115	2·89	...	·87	14	23
XVIII	Inverness (Culloden)	3 0	104	2·41	...	·35	22	20
,,	Portree	0 4	60	10·90	+ ·67	1·70	5	23
,,	Loch Broom	0 8	48	9·42	...	1·42	5	26
XIX.	Helmsdale	1 0	34	4·36	...	·95	5	21
,,	Sandwick	2 0	78	5·63	+3·15	·95	5	24
XX.	Cork	6 0	65	2·61	...	·64	8	14
,,	Waterford	4 0	60	2·70	+ ·67	·49	8	22
,,	Killaloe	5 0	128	5·51	+2·60	·75	24	22
XXI.	Portarlington	9 0	236	2·99	+ ·96	·31	7	25
,,	Monkstown	0 6	100	2·30	+ ·66	·43	6	22
XXII.	Galway	6 0	25	4·64	...	·38	6 & 25	23
,,	Bunninadden (Doo Castle)	1 0	...	3·88	...	·45	6	25
XXIII	Bawnboy (Owendoon)	1 3	218 ?	4·48	...	·68	6	21
,,	Waringstown	0 4	191	2·53	...	·31	7	24
,,	Strabane (Leckpatrick)	0 5	260	4·09	...	·48	24	27

+ Shows that the fall was above the average ; — that it was below it.

METEOROLOGICAL NOTES ON THE MONTH.

[ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; and T S for Thunderstorm.]

ENGLAND.

CAMDEN TOWN.—A wet, uncomfortable month. Vegetation very forward, until checked by frost on 18th; Lilacs in bud on 3rd; T S at 10 p.m. on 4th; sleet on 13th; snow on 26th, ¾ in. deep. Max. temp. 55°·8 on 1st; min. 25°·2 on 18th.

LINTON PARK.—Excepting from 18th to 22nd, the month has been dull and very wet, the ground being too heavy for anything to be done with it. T S on night of 4th; heavy gale on 11th, doing much damage to trees. Max. temp. 57° on 7th; min. 23° on 18th.

SELBORNE.—Very tempestuous month, on 11th a barn was blown completely down; T on 2nd; hail on 4th at 11 p.m., and on 8th at 1.30 p.m.; aurora on 10th, 12th, and 13th. Max. temp. 54°·5 on 7th; min. 22° on 18th.

HITCHIN.—Snow on 27th; L on 4th; lowest bar. for 17 years on 11th.

BANBURY.—T S on 4th at 8.30 p.m., L unusually bright and *blue;* several persons injured in this neighbourhood, but none killed. Hail, T, and aurora on 7th. High wind and T on 11th; L and snow on 12th. Bar. on 12th [? 11th] at 5 p.m., 28·483.

WISBECH.—On 4th T S, L at 6 p.m., and a gale (15 lbs.) at 8 p.m. Solar halo on 14th; Lunar halo on 25th. Bar. min. on 11th, 28·708; max. temp. 53°·8 on 8th; min 26° on 18th

CULFORD.—Heavy T S on night of 4th, vivid L and hail; snow on 13th, 26th, and 27th. Max. temp. 55° on 7th; min. 16° on 28th.

CALNE.—Hail on 4th, 7th, and 8th; L on 4th in evening; snow on 12th, 26th, 27th, and 28th. Primrose and wild strawberry in bloom on 23rd, apricot on 24th.

GOODAMOOR.—On 3rd, at 11 a.m., there came on a furious squall or whirlwind, with L and T, it only lasted 10 minutes, but ·12 in. of rain fell, many trees were blown down and buildings damaged. On 4th, loud T, and stormy at night; L also on 5th and 7th; T S on 9th and L on 11th.

TAUNTON.—Owing to the lamented death of Dr. Gillett, the return from Fulland's School has been adopted, having been kindly supplied by Mr. Reed.

ORLETON.—Warm, rainy and stormy, until 12th; frosty, with occasional snow afterwards. Violent T S on 4th from 7 to 8 p.m., with violent wind, L began in N.W. soon after dark, at 7 p.m. became brilliant, at 7.15 very loud T, at 7.28 a vivid flash of pale white L struck an elm within 400 yards of this house, at 8 p.m. the L passed off to S.E. Distant T on 7th, and L at night.

WIGSTON.—Rain more than double our average. An awful T S, with hail, on the evening of the 4th, lasting about an hour. Considering the time of year, so violent a storm is not recollected. On 7th, temp. 52° at 8.30 a.m.

WEST RETFORD.—Very high winds during the first week. On 4th, from 6 to 6.45 p.m., T S with a N.W. gale.

DERBY.—Mean max. temp. 47°·3, mean min. 34°·2; max. 53°, min. 25°.

MANCHESTER.—After the first nine days, the mean temp. was generally low.

YORK.—On 4th, T S in evening. Snow on 21st and 28th.

ARNCLIFFE.—Very wet at beginning of month, changeable afterwards. On 7th T S. Max. temp. 42° on 10th; min. 22° on 14th.

N. SHIELDS.—Snow on 5 days. Aurora on 5th, 7th (with luminous arch), 12th, and 13th. Hail on 6th, 27th, and 28th. Lunar halos on 1st, 25th, and 26th. L on 4th and 7th. Yellow aconite in flower on 4th, crocus on 7th, and heath on 17th.

SEATHWAITE.—February was distinguished by a succession of boisterous winds and heavy rains. There were 8 days with more than an inch of rain, and 4 with over 2 inches. Snow on 14th, 27th, and 28th, but only slight.

WALES.

ABERCARN.—Wet and boisterous until 15th; fine and cold afterwards. At 8 p.m. on 4th, a heavy T S. with very vivid L and a gale of wind. Very heavy rain on 10th, with high N.E. wind. Snow on 12th, 13th, and 25th to 28th.

HAVERFORDWEST.—February has furnished almost every variety of weather; exceedingly stormy, with low barometer pressure; at times very mild, uniformly

wet, yet no very heavy falls, the heaviest, ·80, on 10th, accompanied by a severe gale. About this date the weather became much colder, and continued so with varying degrees of severity to the end of the month. The 17th and 18th, and from 25th to the end were characterized by much severity, which affected the health of the community very sensibly, the more so coming at the close of so remarkably mild a winter. Very stormy at night on 4th, with T S and heavy rain. L on night of 16th and 26th. First snow this winter on 13th.

RHAYADER.—T S at 2.30 p.m. on 3rd; and a heavy T S with extremely vivid L at 7 p.m. on 4th. Snow on 13th, 27th, and 28th. Tom Thumb geranium in full leaf in open ground, unprotected, on 8th; snowdrops, crocuses, &c., in blossom. Thrushes singing during the whole month.

SCOTLAND.

DUMFRIES.—Stormy, warm, and wet, frequent snow after 12th. On evening of 7th a beautiful luminous arch, double the breadth of a rainbow, spanned the heavens from E. to W., and from horizon to horizon. The bow was white, pure and brilliant, of a fleecy-looking texture, through which the stars were visible, particularly the Pleiades. The bow was visible about an hour, disappearing about 8.30 p.m. There was sheet L before and after the appearance of the arch, and after midnight a bright aurora.

HAWICK.—Snow on 26th, 27th, and 28th.

AYR.—Snow on 13th (4 in. deep), 14th, and 24th. Hail on 3rd and 8th. T S at night on 8th; L at night on 22nd. On 6th, at 10.10 a.m., a heavy squall from W.S.W.; only lasted 4 minutes, but blew down 11 trees, all laid to N.E. Max. temp. 51° on 4th. Min. 22° on 17th.

OTTER HOUSE.—Weather more like beginning of winter than of spring. Stormy. Rain nearly double our average, alternating with hail and snowstorms. T S on 3rd, 7th, and 9th. Aurora on 7th, 12th, and 13th. On 15th, 6 inches of snow. Snow still (28th) on distant hills, but it has all gone from the valleys; it has, however, become colder, and the ther. is at 19°, being the lowest this winter.

FORT WILLIAM.—Gale from S.W. on 5th. T on 7th. Snow on 13th, 23rd, 25th, 27th, and 28th, with hard frost on the last day.

NOOKTON.—Severe wintry weather, frost, snow, and high winds. Min. 23° on 21st.

DEANSTON.—Very stormy on night of 3rd, with hail and some L. Great gale on night of 4th; many trees uprooted. Snow on 13th, 8 in. deep. T and L on 21st. Frequent snow and hail showers, and wet stormy weather. Max. temp. 47°·4 on 1st. Min. 16°·8 on 21st.

LOGIERAIT.—Upon the whole a fine month, but we have had two heavy falls of snow, and more frost than in any previous month this winter. On the 28th the Highland Railway became blocked with snow, for the first time this season.

BALLATER.—A very stormy month; several gales, the strongest on 6th, uprooting trees, and doing other damage. Bright aurora at 11 p.m. on 5th. Remarkable meteor at 8.45 p.m. on 22nd.

ABERDEEN.—Hurricane from W. on 6th. L on evenings of 4th, 7th, 15th, and 22nd. Aurora every night but 8, viz., 2nd, 14th, 18th, 19th, 21st, 22nd, 26th, and 28th. The aurora on 7th was magnificent; one brilliant arch in N., another crossing the sky south of the zenith (through Orion) from W.N.W. to E.S.E. At times vivid flashes of L, when the second arch *disappeared*, reappearing again in a few minutes. The coincidence of the L, and the disappearance of this arch, happened more than once.

CULLODEN.—Very heavy S. to W.N.W. gale destroying many trees on 6th. T on night of 2nd, L on 6th, and T S on 22nd. Snow on 12 days.

PORTREE.—Colder and more stormy than usual, so much so, that the fishermen rarely got out to sea. The gale from midnight of 5th, to noon of 6th, did a great deal of damage, especially about 5 a.m. The church and manse of Snigort were much injured, most of the slates and lead roofing being taken off, and the windows blown in. Aurora on 13th, so bright as to cast strong shadows. T S on 4th, from 2 to 3 p.m, L all the evening; T on 5th; T S on 6th, from 4 to 6 a.m.; on 9th, at 7 p.m.

LOCHBROOM.—Weather very changeable, frost, rain, and snow constantly alternating; frequent heavy gales.

HELMSDALE.—Changeable and disagreeable month; a succession of violent gales until 9th. Snowdrops in flower on 1st.

SANDWICK.—Rain double the average; temp. below it. Gales on 6th, 7th, and 23rd, of 50 miles an hour. T S on 22nd. Aurora on 9 nights; on 14th with well defined arch. Remarkable fire-ball on 22nd, about 8.30 p.m., larger than the moon, and moving from N.E. to S.W.

IRELAND.

WATERFORD.—February is usually one of our driest months, but this year it has been damp and drizzling, and the latter part very cold.

KILLALOE.—The wettest February but one (1848 = 7·76) for 20 years, with sudden changes and violent winds. On 4th, at 1.30 p.m., violent storm, continuing till night, at 4 p.m. T S, and much sheet L at night.

MONKSTOWN.—Severe gale at 9 a.m. on 4th; bright sheet L at 8 p.m. in S.E.; no clouds at the time. Bright aurora with arch, but no streamers, on 7th. On 16th a heavy fall (about five miles from here) of *pellets* of snow, which in 15 minutes covered the ground some inches deep.

GALWAY.—On 7th, aurora, followed by T.

DOO CASTLE.—A wet month, with frequent snow. T S on 2nd and 4th, at night.

OWENDOON.—First severe month this winter; last few days intensely cold. T on 8th.

WARINGSTOWN.—Very stormy and wintry month; latter part generally frosty, with snow. Tremendous squalls, with T, L, and hail, on 4th.

LECKPATRICK.—Very similar month to February, 1865; same mean temp., same number of frosty nights, but rather more rain. Snow at times.

THUNDERSTORM ON FEBRUARY 4TH.

In addition to the many notices given in the Observer's Notes, the following are interesting, as showing how general, and how nearly simultaneous was the storm on this evening:—

RUGBY, 4th February, 1866.—(Frederick Fuller, Esq.)—A severe storm of lightning, wind, hail, and rain, commenced at 6.30 p.m., and lasted until 8.30 p.m. Wind S.W. Thermometer 42°; barometer (corrected) 29·533. The amount of rain and hail that fell was ·34 of an inch. The storm commenced to the north of the town, and went round by the west to the south. The previous part of the day had been windy and unsettled.

CHIPPING NORTON, KINGHAM.—(Rev. J. W. Lockwood.)—We had a violent hailstorm, with vivid lightning for about ten minutes. Although the hail was very heavy, no damage was done.

LINCOLN.—A terrific storm of thunder and lightning, with hail, rain, and fierce gusts of wind, broke over Lincoln on Sunday evening. The flashes of lightning were awfully vivid and brilliant, while the thunder burst forth in majestic peals, the rain meanwhile pouring down in torrents, and the wind raging with great violence. Altogether it was a most fearful storm, and produced terror and alarm in the minds of many, the congregations at the various places of worship being evidently greatly affected. Such a phenomena at this season of the year is of very rare occurrence. We have not heard of any serious damage being done by it. The west window of St. Nicholas' Church, Mewport, was blown in, and also several squares of glass in the other windows. The congregation became greatly alarmed thereby, and many rose to leave the edifice, but happily, through the exertions of two or three gentlemen, their fears were quieted, and the service was proceeded with.

MARLBOROUGH COLLEGE.—(Rev. T. A. Preston.)—We had no storm here, but lightning was seen, and at Salisbury there was a heavy thunderstorm with hail, between 11 p.m. and midnight.

BROMSGROVE.—(G. Dipple, Esq.)—Violent thunderstorm from 7.30 to 8.30 p.m.

BAROMETER DURING THE GALE OF DECEMBER 31ST, 1865.

Northern Lighthouse Office, Edinburgh,
February 2, 1866.

SIR,—Will you permit me to direct attention to the following remarkable facts connected with the barometer on the occasion of the late severe storm of 31st December last?

The Commissioners of Northern Lighthouses get from all their lighthouse stations monthly statements which embrace a daily return of two readings of the barometer. The lightkeeper at the Butt of the Lewis (170 feet high) returned the lowest reading of the barometer during the gale of the 31st December last as 27·50, which, reduced to the sea level, gives 27·691. There could be no mistake in the figures, as they were twice distinctly stated; but it was so unprecedentedly low for this climate that it could scarcely be credited. It is very remarkable how general the fall on the north and north-west coasts of Scotland has been, and how completely the return of the Butt lightkeeper is borne out. I send you a note of some stations with the actual return, the height of the lighthouse, and the reading reduced to the sea level:—

	Actual Return, lowest reading on Dec. 31, 1865.	Height of Lighthouse.	Return Reduced to Sea Level.
North Unst, Shetland	27·76	230	28·01
Whalsey Skerries, do.	27·85	145	28·01
Bressay, Lerwick, do.	27·97	105	28·09
Sumburgh Head, do.	27·80	300	28·13
N. Ronaldshay, Orkney	27·88	140	28·03
Start Point, do.	28·00	100	28·11
Hoy Lowlight, do.	27·57	55	27·63
Cantick Head, do.	27·91	115	28·04
Noss Head, Caithness	28·00	175	28·19
Pentland Skerries do.	28·04	170	28·23
Dunnet Head, do.	27·73	346	28·11
Holburn Head, Thurso	28·01	75	28·10
Cape Wrath, Sutherland	27·76	400	28·20
Stornoway	28·43	56	28·50
Island Glass, Harris	28·16	130	28·31
Ushenish, South Uist.	28·80	176	28·00
Barra Head, Barra	27·44	680	28·14
Monach, W. of Hebrides	27·75	150	27·92
Skerryvore	28·24	150	28·39

Even on the north-west coasts of the mainland the effects were felt—

Rona, Skye	27·79	222	28·04
Ardnamurchan	28·08	180	28·28
Sound of Mull	28·30	65	28·38
Lismore	28·30	105	28·42

These quotations are all, even the highest, unusually low, and may prove interesting to scientific inquirers on such subjects.—I am, &c.,

ALEX. CUNNINGHAM, *Sec.*

[The gale on 31st, blew at Sandwick (at 7 a.m.), 60 miles per hour. At Culloden, at 4 a.m., 31st, the barometer fell to 28·20 in., fully corroborating the above remarkably low readings.]—ED.

ON A PERIODIC (?) FALL OF SOFT HAIL, OR SNOW-BALLS, ON MARCH 8TH.

The following paragraph in my "Meteorological Report," for March, 1859, published in the *Times* early in April of that year, I reproduce verbatim, and append fuller details, since subsequent experience seems almost to have rendered the supposed periodicity an established fact :—

1859.—March 8th, from 4.45 to 4.58 p.m., an ordinary hail shower from N.W.; at 5.20, another nimbus from the same point began to discharge balls (stones I cannot call them, as they were soft, like miniature snowballs of ·2 inch diameter), which whitened the ground, and drifted in clouds like sleet, though when melted they only yielded ·02 inch of water.

There was much positive electricity, and the temperature fell nearly 13 degrees. The delicate rose-pink of the clouds around the setting sun contrasted with the dark hail-cloud hurrying away to S.E., had a very beautiful effect.

At Bungay (Suffolk) a violent thunderstorm from N.W., at 11.30 a.m.

It is perhaps worthy of note, that on the same day, in three successive years, a somewhat similar fall has occurred ; the large hail-balls of March the 8th, 1857, will probably be remembered by many, even of your unscientific readers, as being an inch in diameter, and lying on the ground two or three inches thick ; and further, Luke Howard, in his valuable "Climate of London," records a fall of "soft hailstones" on the corresponding day 40 years before (1817), his sketch of which strikingly resembles the photographs taken by Mr. Glaisher in 1857.

The paragraph in Luke Howard's "Climate of London," Vol. II., p. 325, is :—

1817, March 8th.—Windy ; snow in flakes about 1½ in. in diameter ; sleet and rain ; at noon large cumuli in N., passing to cumulo strati, the sky above them being blue, to 15° of the cyanometer. About 2 p.m. a sudden shower of hail from a dense lofty nimbus; the balls were opaque, in the form of a cone, with a rounded base, about half an inch in diameter, and composed entirely of striæ, meeting at the apex of the cone. We have had similar hail repeatedly of late.

I next quote from my observation book, the account of the fall in 1857 :—

1857, March 8th.—Till 11 a.m. fine ; at 11.18 a.m., hailstorm, which reduced the temperature of the air from 45·4 to 35·0 ; fair till 3 p.m. At 3.5 a very black cloud coming in a N.N.W. current, discharged balls of solidified snow, which till 3.12 did not exceed ½ an inch in diameter ; by 3.15 they had increased greatly in size and number, the size of many of them being 1 inch long, and ½ to ¾ of an inch in diameter, the number being such as to cover the ground 1½ or 2 inches deep ; they had also at this time assumed a most remarkable uniformity of shape and structure, presenting somewhat the appearance of a freshly-broken piece of iron pyrites, only crystallized at a somewhat more acute angle ; they ceased even more suddenly than they began, for at 3.25 the sun was shining brightly ; at 3.45, however, another change occurred ; a very high wind suddenly arose, bringing with it a very heavy fall of snow, which again brought the temperature down so much, that the snow which fell on (or rather covered) my coat, was immediately converted into a tissue-like sheet of ice ; this also was of short duration; it ceased at 4.5 p.m.

9th.—Several showers of snow in the early part of the day, but at 5.5 p.m. a very heavy one commenced, the wind being N.W., it shifted to N. and snow fell ; to E. hail fell, and kept on oscillating N., bringing snow, and E. hail ; this only lasted about 10 minutes.

10th.—A small quantity more snow.

Of the fall in 1858 no record is preserved, save that hail fell, and the depth when melted was ·047 in. The account of the fall in 1859 is given above. In 1860, a little snow fell. Nothing fell in 1861 or 1862. In 1863, hail fell at 2.15 and

4.45 p.m. In 1864, there was a fall of ·030, but, being from home, I am not certain of its form; snow was reported in the neighbourhood. In 1865, there was a fall of snow at 4 p.m. (Snow also fell on 9th, and on 10th at 3 p.m.)

Lastly, in 1866 the fall of snow-balls, or soft hail, commenced at 0.50 p.m., when the temp. was 42·0, and the wet bulb 39·4, wind N., and the previous temp. 47·2; they ceased about 1.20, when the temp. had fallen to 34°·8 and 34°·6, the air having thus fallen 7° and become saturated with vapour in half-an-hour—the temperature fell altogether 12°, but part of the decrease was *before* the actual fall of the balls. They were tolerably regular in form, the usual pyramid with a cauliflower-like base, but were not so regularly striated as I have generally seen them; their temperature was 28°·5, they covered the ground about ·2 in. deep, and their density was about 5 times that of ordinary snow, and about a third that of water or ice. T was heard at 1.22, and L seen at 1.27 p.m.

A few flakes of snow at 8.30 a.m. on 10th.

During the last ten years snow or hail has fallen at Camden Town 37 times in March. On the 8th it has fallen 8 times, on the 9th 5 times, on no other day more than twice, and on 13 days it has never fallen.

I have tried to test by Mr. Glaisher's Quarterly Reports to the Registrar-General, 1853–65, the relative frequency of snow and hail on each day in March. The result is a marked excess on 8th, and 9th, but none is reported in 1853–54, or 1856. Secondly, I have taken out from Howard's "Climate of London," every day on which snow or hail occurred during the 25 years, 1806–30, and I find therefrom that hail fell oftener on March 13th, than on any other day in the year, and that snow was very frequent on March 6th, 7th, 10th, and 11th; more so, in fact, than on most days in January. Taking snow and hail together, they fell on 6th, 10th, 11th, and 13th, twice as often as the average of the month.

I wish to avoid anything like special pleading in favour of a periodicity I should have been foremost to criticise; I therefore leave the above facts to fight their own battle; it is certainly novel to hear a periodic hailstorm spoken of as coolly as a periodic display of shooting stars—but it must not be shelved because it is novel: it has occurred on the same date in every year since 1857, except 1861 and 62. that is to say, 8 years out of 10.

METEOR ON FEBRUARY 22ND, 1866.

From the Notes on the Month, it will be seen that this was seen at Sandwick 8.30 p.m., larger than the moon, moving from N.E. to S.W.; Ballater 8.45 p.m. It was also seen at Wick, Thurso, Keith, New Pitsligo, Crieff, and Aberdeen; also as far S. as Halifax. I append abridgments of three reports.

WICK.—*(John o'Groat's Journal.)*—"This evening a meteor of remarkable size and brilliancy passed from E. to W.; as it descended a cone of intensely luminous matter was distinctly visible in advance of the trail, when all at once it exploded into a shower of sparks and disappeared, the explosion sounded like a short, dull peal of thunder. The light was of a bluish tinge, threw strong shadows, lightened up dark rooms, scared horses, and frightened more than one traveller."

KING'S CROSS, HALIFAX, YORKSHIRE.—(Rev. J. Gledhill.)—About 8.15 p.m. saw a fine fire-ball in N., about 50° above horizon. Its path was an apparently horizontal line towards N.N.E., and extended at least 90° in that direction. Its motion and light were uniform; colour, silvery white; no trail, nor luminous haze. Larger than a 1st magnitude star.

MUTHILL, CRIEFF.—(Rev. A. J. T. Morris.)—At 8.45 p.m. a brilliant meteor suddenly appeared in the N.N.E., 50° above the horizon; it was dazzlingly bright, bluish white, and about a sixth the size of the moon; it hovered for a moment, then fell slowly about 12° slanting slightly to N. It then changed from spherical to oval, became red, and threw out a tail 5° long, but continued its course for 10° more, when it resumed its original colour and form and disappeared suddenly, without explosion or fracture, in due N., about 20° above the horizon. I believe its disappearance arose solely from its passing behind a thick cloud.